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ABSTRACT

A study compared the intellectual development among 118 technical college instructors aged 35-65 who had different educational backgrounds. In a 3 x 2 factor design, 3 groups of educational experience (no baccalaureate degree, baccalaureate degree, and master's degree) were represented, with 20 subjects (10 men and 10 women) in each group. The subjects completed the Learning Environment Preferences (LEP), a survey that was developed by William Moore on the basis of William Perry's Schema of Intellectual and Ethical Development. The LEP consists of five domains related to epistemology and approaches to learning: view of knowledge and course content; role of the instructor; role of student and peers in the classroom; classroom atmosphere; and role of evaluation. Qualitative data were also collected in four focus group discussions. Those instructors with master's degrees scored significantly higher in intellectual development than did those instructors with either a baccalaureate or less than a baccalaureate degree. Gender also appeared to be related to intellectual development (women scored significantly higher in intellectual development than men did). Age, on the other hand, did not appear to be significantly related to intellectual development. (Contains 22 references.) (MN)

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# A Descriptive and Interpretive Study:

# The Intellectual Development

# of Adults

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Running Head: Intellectual Development

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**A Descriptive and Interpretive Study:**

**The Intellectual Development**

**of Adults**

William Perry (1968) developed the Scheme of Intellectual and Ethical Development that identifies stages of development where knowledge structures have different epistemological frameworks. Epistemology is the belief system held by an individual about a particular content or knowledge base which affects learning. For instance, some students may believe that a computer application course is simply a discipline that requires rote memorization of declarative knowledge, other students may believe that application and problem solving are the basis of knowledge. Each student's belief systems affects how that student will learn.

## Statement of the Problem

Research shows that education and age are related to intellectual development. As students age and progress through their college years, intellectual development progresses also. To test education and age as separate variables, traditional- and nontraditional- aged students have been used. *Traditionally-aged students* have been consistently defined in the literature as 18 years old (freshman) to 22 years old (seniors). However, the definition of *nontraditionally-aged students* has varied. Three studies have defined *nontraditionally-aged students* under 30 years of age (Lawson, 1980; Schmidt, 1983; Strange, 1978). Three other studies have used students between 22 and

55 years of age; although, the age distributions were not reported (Glatfelter, 1982; Mentkowski et al., 1983; Shoff, 1979). The inconsistent definition of *nontraditionally-aged students* and the lack of data on the age distribution of the subjects makes it difficult to extrapolate the influence of education and maturation on intellectual development. As Terenzini and Pascarella (1990) state, "The absence of rigorous research on the effects of college on . . . older students [nontraditional] is particularly embarrassing to the higher education research community."

## Purpose of the Study

The purpose of this study was to compare the intellectual development among technical college instructors between the ages of 35 and 65 with different educational backgrounds.

Among technical college instructors the research questions were:

1. Is there a difference in intellectual development among levels of education (nonbaccalaureate, baccalaureate, and master's degree)?
2. Is there a difference in intellectual development between males and females?
3. What are the relationships between intellectual development and age, education, and gender?

The expectations were that (a) there would be significant differences among levels of education, (b) there would be no significant gender

differences, and (c) there would be a significant relationship between intellectual development and education, not with age and gender.

## Overview of the Perry Schema

William Perry's Scheme of Intellectual and Ethical Development (1968, 1979 & 1981) is divided into four different epistemological frameworks regarding knowledge--Dualism, Multiplicity, Relativism, and Commitment. Table 1 shows there are nine positions representing the four epistemological frameworks. Positions are static (stationary) and development is defined as movement towards the next higher position.

Dualism, Position 1, begins with the belief that there is one right authority. In Position 2, True authorities are right and others are frauds. In Dualism, there are two realms--Good versus Bad--and knowledge is quantitative. The learners view themselves as a receptacle absorbing Truth. Consequently, learners have difficulty when confronted with conflicting viewpoints or when asked for their own personal opinion.

Early Multiplicity, Position 3, says we are still waiting for the real Truth to explain uncertainties. Position 4 begins with everyone having a right to their own opinion where Authorities don't know the right answer. In Multiplicity, the learner acknowledges different viewpoints. Judgment of these viewpoints, however, is made on the basis of quantity. Therefore, the learner has difficulty justifying their opinions.

**Table 1**

William Perry's Schema of Intellectual and Ethical Development

| Positions | Description |
|---|---|
| **Dualism** | |
| 1 | Knowledge is absolutely certain and received from Authorities. Beliefs are a direct reflection of reality and do not need justification. |
| 2 | True Authorities are Right and others are Wrong. Problems have one Right answer. |
| **Multiplicity** | |
| 3 | There is absolute certainty about some things and temporary uncertainty about some things. Uncertainty implies the legitimacy of multiplicity of answers. |
| 4 | Opinions are being developed independently, mostly unsupported. |
| **Relativism** | |
| 5 | Individuals can compare conflicting ideas across different contexts, abstract common elements of ideas and criteria across different perspectives for evaluation, test ideas and assumptions, and synthesize perspectives. |
| 6 | The individual begins to apprehend the necessity of orientating oneself in a relativistic world by making a personal commitment. |
| **Commitment** | |
| 7,8,9 | The individual begins by making one commitment in Position 7, several commitments in Position 8, and finally shows strong beliefs in their values in Position 9. |

Note. Adapted by Barbara Wilson from Perry, W. (1970). Forms of Intellectual and Ethical Development in the College Years: A Scheme. New York: Holt, Rinehart and Winston.

Position 5 moves all thinking to Relativism. Learners perceive knowledge and values as contextual and relativistic. Dualistic functions take a subordinate status, also in context, of a special case. Analysis, synthesis, and judgment are present, as well as metacognitive processes. In Position 6, comes the realization that learners must make their own decisions in this uncertain world. The learner begins to apprehend the necessity of orientating oneself in a relativistic world by making a personal commitment. In Relativism, all knowledge is disengaged from the concept of Dualism--absolute Truth and "good" versus "bad." The learners see themselves alone in a chaotic world and feel the loss of simpler, dualistic guidelines. Now the learners must create their own "truth" based on their own experiences.

Position 7, begins with making one commitment. Position 8 moves to making several commitments. Finally, Position 9 shows strong beliefs in one's values. In Commitment, judgment is evident from patterns for analysis and comparison. Diversity is welcomed and respected. Life is an ongoing dialectical process. Knowledge is qualitative and dependent on contexts.

Perry's Schema of Intellectual and Ethical Development (1970) is based on adaptation which accounts for change and growth in epistemological development. Assimilation and accommodation are principles of adaptation. In assimilation, an individual has a mental structure for a belief about knowledge and truth. Here it is important to note that the process of

assimilation does not involve change in the mental structure, rather new knowledge is assimilated into the existing structure. In accommodation, new knowledge is encountered, and the existing mental structure is modified.

In Positions 1 to 4, the mental structure is Dualism. Modifications are made during each transition where the individual assimilates Multiplicity to the assumptions of Dualism with minimal accommodation. Multiplicity is first assimilated as a difference of opinion, which is quite temporary, and progresses to an unavoidable uncertainty where individuals independently develop opinions. Up to this point, individuals are able to assimilate new knowledge into a fundamentally dualistic structure with minimal accommodation.

In Positions 5 to 9, the mental structure is Relativism. New context is dominant and Dualism becomes subordinate. Dualistic ideas become special cases in the new relativistically structured context. This represents a major change or accommodation to the epistemological structure. Meaning and truth depend on context. There are many truths, but they must be judged within a context and its rules of inquiry and evidence. Each individual and society must discover what is true or right relative to that individual or society.

## Review of the Literature

Research shows that movement on Perry's Scheme of Intellectual and Ethical Development is related to age and education. Older subjects with more education reason at higher stages of intellectual development than do their

counterparts with less education (Kitchener & King, 1981; King, Kitchener, Davison, Parker, & Wood, 1983; King, Kitchener, & Wood 1985; Schmidt, 1983; Mentkowski, Moeser, & Strait, 1983; Welfel, 1982).

Age and education have been tested separately by comparing traditional- and nontraditional-aged groups of students with the same education. Five out of six studies found college experience, not age, to be critical to intellectual development (Mentkowski et al., 1983; Reisetter Hart, Rickards, & Mentkowski, 1995; Schmidt, 1983; Shoff, 1979; Strange, 1978). One study (Glatfelter, 1982), using all women, found age to be more critical than education. Another study (Lawson, 1980) did not find age or education significant because education was confounded by the fact that four years of education was the mode in the study. The generalizability of the findings in the studies investigating age is limited, however, to definition of *nontraditional* as discussed in the problem statement.

The differences in intellectual development between men and women has also proved inconsistent. Some studies found no gender differences in intellectual development (King et al., 1983; Welfel, 1982; Welfel & Davison, 1986). However, when King et al. (1983), statistically removed the effects of verbal ability, the intellectual development of men was significantly higher than women. Other studies have also found the intellectual development of men significantly higher than women (King, Wood, & Mines, 1990; Strange,

1978; Shoff, 1979; Lawson, 1980). One study, however, found the intellectual development of women higher than men (Schmidt, 1983).

## Method

### Population

One institution was selected as the population to test the differences in intellectual development among educational levels. Subjects between the ages of 35 and 65 with varying levels of education were tested. This was an attempt to broaden the theory of intellectual development by investigating age and maturation on a limited basis in a controlled environment. The assumption was that the findings from this study would generate more research questions on the theory of intellectual development and the study would be replicated in other environments.

The context in which the instrument is administered is important. The instrument is designed for an educational environment where the subject is a student in a learning situation. Instructors at this technical college had been participating in a special program of coursework through a large midwestern university since the fall of 1990.

Coursework was being offered through a special Carl Perkins grant for participation on accommodation teams to better serve special-needs students. Courses were offered onsite at the technical college for university credit. Tuition was paid for through the grant. Instructors could use the college coursework towards a degree if they desired. This technical college was

chosen for the study because 102 staff members out of 120 had participated in the coursework offered by the university over the last three years. Two instructors out of 120 were under the age of 35 and were removed from the population.

Sample

The 118 faculty members in the population were divided into the following populations: men with a master's degree, women with a master's degree, men with a bachelor's degree, women with a bachelor's degree, men without a bachelor's degree, and women without a bachelor's degree. Sixty technical college instructors were randomly selected from six the populations to assure that educational experience and gender were represented equally in groups and subgroups. In a 3 x 2 factor design, three groups of educational experience (no baccalaureate degree, baccalaureate degree, and master's degree) were represented with 20 subjects in each group; each group had 10 males and 10 females. Information on age, gender, and educational level were obtained from the human resource department of the technical college.

The size of the groups was influenced by past research and a power test. Of the 23 studies in the literature review, 10 compared groups. The size of groups ranged from 14 to 30 subjects in the following studies: Kurfiss (1977)--14 subjects per group; Strange (1978), Glatfelter (1982), and Welfel (1982)--16 subjects per group; Kitchener and King (1981), Lawson (1980),

King et al. (1990), King el al. (1983)--20 students per group; and Brabeck (1983)--30 subjects per group.

A power test was calculated for a two-sample, two-tailed study from data for first-year graduate students (30 students per group) using Brabeck (1983) and for master's students (20 students per group) using Lawson (1980). Power was calculated to be 95 percent. This means that there was a 5 percent chance of making a Type II error of not finding a difference that was there. Therefore, it was reasonable to use 20 subjects per group.

The age frequency distribution for technical college instructors is shown in Table 2. The largest frequency of technical college instructors was between

**Table 2**

Age Distribution of Technical College Instructors

| Age | f | % f |
|---|---|---|
| 35-37 | 4 | 7 |
| 38-40 | 2 | 3 |
| 41-43 | 14 | 23 |
| 44-46 | 9 | 15 |
| 47-49 | 7 | 12 |
| 50-52 | 4 | 7 |
| 53-55 | 5 | 8 |
| 56-58 | 4 | 7 |
| 59-61 | 9 | 15 |
| 62-65 | 2 | 3 |
| | N = 60 | 100% |

41 to 49 years of age, representing 50 percent of the distribution. The next largest frequency was between 53 to 61 years of age, representing 30 percent of the distribution. Since concentration of instructors was in the 40s and late 50s, this was a good sample for expanding the theory of intellectual development on a limited basis. Also, the mean ages for levels of education and gender indicate that the general trend of the instructors' ages were similar for all groups. In Table 3, the mean age was 48 for nonbaccalaureate, bachelor's degree and master's degree. Overall, the mean for males was 49.7 and 47.7 for females.

**Table 3**

Summary Statistics of Age for Level of Education and Gender

| Groups | Mean | SD | n |
|---|---|---|---|
| Nonbaccalaureate | 48.9 | 8.80 | 20 |
| Male | 50.0 | 9.40 | 10 |
| Female | 47.7 | 8.50 | 10 |
| Bachelor's Degree | 48.7 | 7.90 | 20 |
| Male | 47.7 | 7.18 | 10 |
| Female | 49.6 | 8.85 | 10 |
| Master's Degree | 48.5 | 6.89 | 20 |
| Male | 51.3 | 7.08 | 10 |
| Female | 45.7 | 5.69 | 10 |
| Male | 49.7 | 7.83 | 30 |
| Female | 47.7 | 7.71 | 30 |

Instrument

William Moore developed an objective measure, The Learning Environmental Preferences (LEP), based on the Perry scheme which was used for this study. Internal consistency of the LEP instrument was completed by performing an item factor analysis using Cronbach's alpha. The reliability coefficients for each position were as follows: Position 2, .81; Position 3, .72; Position 4, .84; and Position 5, .84. The LEP was then compared to the Measure of Intellectual Development created by Mentkowski and associates (1983). (The MID is an open-ended interview measure with a standard set of questions.) An ANOVA was calculated for the LEP means across class (freshmen, sophomore, junior, and senior) and the $F = 4.55$, $p > .01$. indicating significant differences among the subgroups with a consistent upward trend by class paralleling the MID results.

The Learning Environmental Preferences (LEP) is a survey consisting of five domains related to epistemology and approaches to learning: (1) view of knowledge and course content, (2) role of the instructor, (3) role of the student and peers in the classroom, (4) the classroom atmosphere, and (5) the role of evaluation. Each domain presents a list of 13 specific statements beginning with the least complex items followed by a mixture of more complex items. Participants are asked to rate each statement in terms of its significance or importance using a rating scale from (1) not at all significant to (5) very significant.

The (LEP) measures the intellectual portion of Perry's scheme, Positions 1-5 (Dualism--Positions 1 and 2, Multiplicity--Positions 3 and 4, and Relativism--Position 5). Position one is ignored, however, because it rarely exists at the college level. Beyond Position 5, there is a shift in focus from intellectual to ethical development, however, it is very difficult to measure ethical development (Commitment--Positions 7-9) using an objective survey instrument. Each statement in the five domains represents a position in Perry's Scheme.

Procedure

Instructors in the sample received a memo asking them to participate in the study. Three different dates and times to complete the instrument were offered. The researcher administered each session. Instructors were given the consent form, data sheet, and LEP instrument to complete.

Respondents were asked to rate each item with respect to its importance to them in an ideal learning environment. The instrument takes most participants 30-45 minutes to complete. Subjects need to be reminded that they should be thinking of their ideal learning environment and not be bound by any specific course or type of course.

Data Analysis

Scoring of the LEP was conducted by the Center for the Study of Intellectual Development (CSID). An LEP score report was provided by CSID listing the cognitive complexity index (CCI)--the primary score index for

the LEP measure which reflects a single numerical index along a continuous scale of intellectual development from 200 (Position 2) to 500 (Position 5). The LEP score corresponds with the positions in Perry's (1981) Scheme as shown in Table 4.

A two-way ANOVA was run for research questions one and two with intellectual development the dependent variable and level of education and gender the independent variables. Multiple regression was run for research question three with intellectual development the dependent variable and gender, age, and education the independent variables.

Qualitative Inquiry and Methodology

A second level of inquiry followed the quantitative procedures. Four focus groups were used to provide insights about the meaning and interpretation of the findings. Prior to the research, Richard Krueger (1988) was consulted about the number of focus groups, the composition of the groups, and the script. Two groups were formed with participants having the lowest scores. Another two groups were formed with participants having the highest scores. Each group consisted of six subjects including males and females.

A date, time, and place was set for each group and subjects were invited to participate. Selection of subjects was according to the distribution of scores on the LEP. Starting with the lowest and highest scores, instructors were personally invited by the researcher until the groups were formed. A

**Table 4**

LEP Scores and Corresponding Positions of Intellectual Development

| Position and Score | Position Description |
|---|---|
| **Dualism** | |
| Position 2<br>200-240 | True Authorities must be Right, the others are frauds. We remain Right. Others must be different and Wrong. Good Authorities give us problems so we can learn to find the Right Answer by our own independent thought. |
| Transition<br>241-284 | But even Good Authorities admit they don't know all the answers yet! |
| **Multiplicity** | |
| Position 3<br>285-328 | Then some uncertainties and different opinions are real and legitimate temporarily, even for Authorities. They're working on them to get to the Truth. |
| Transition<br>329-372 | But there are so many things they don't know the answers to! And they won't for a long time. |
| Position 4<br>373-416 | In certain courses Authorities are not asking for the Right Answer; They want us to think about things in a certain way, supporting opinion with data. That's what they grade us on. |
| Transition<br>417-460 | But the "way" seems to work in most courses, and outside them. |
| **Relativism** | |
| Position 5<br>461-500 | Then all thinking must be like this, even for Them. Everything is relative but not equally valid. You have to understand how each context works. Theories are not Truth but metaphors to interpret data with. You have to think about your thinking. |

choice of two times was offered. A memo was sent to each participant confirming the date and time.

At the beginning of the focus groups, it was explained that the purpose of the focus group was to help explain the findings. Diversity of individuals' perceptions, attitudes, feelings, opinions, and manner of thinking would be encouraged throughout the discussion rather than consensus. The following questions represent the script:

1. In the literature, there are different definitions of critical thinking. What does the concept critical thinking mean to you?
2. In your experience as an instructor, what are some of the ways your students learn critical thinking skills?
3. With the acceleration of change, how do we prepare students for work situations where they do not have the answers?
4. In the next 3-5 years, what changes do you foresee in your classrooms? . . . How do you see yourself changing?
5. What influenced your decision to become a teacher? . . . What do you like best about your job? . . . What do you like least about your job?
6. What influences your decision whether or not to take a college course? . . . What should be the purpose of college courses?

Following discussion of the six questions, the findings were briefly presented for the research questions in the study. Reaction to the findings was invited, as well as, participants' insights for explanations. The groups were told which framework (Stage 3 or 4 of Multiplicity) of intellectual development the members of the group

collectively represented. The preferred learning environment for that group was presented and validated through discussion.

The focus groups were approximately one hour in length and were taped. Analysis included: (a) reading the summaries at one sitting and making notes of potential trends and patterns, (b) reading each transcript, and (c) reading the transcripts concentrating on one question at a time with consideration for the words, the content, internal consistency, specificity of responses, big ideas, and the purpose of the focus groups (Krueger, 1988).

## Results and Discussion

### Distribution of Intellectual Development

In Table 5, the frequency distribution of intellectual development by level of education shows 72 percent of technical college instructors in this study in Multiplicity, Positions 3 and 4. Position 5 (Relativism) was not represented. The intellectual development of technical college instructors in this study can be compared to two other studies. In the first study, Beers and Bloomingdale (1983) investigated epistemological and instructional assumptions of college teachers from a small liberal arts college in the east. They found 45 percent of the faculty in Relativism which was the mode. In the second study, Simpson, Dalgaard, and O'Brien (1986) investigated faculty assumptions about the nature of uncertainty in medicine and medical education at the University of Minnesota. Sixty percent of faculty members who participated in the study were in Multiplicity. Comparing representation in the categories of intellectual development in this study to these two studies should be

**Table 5**

LEP Score Frequency Distribution of Technical College Instructors by Level of Education

| | Frequency | | |
|---|---|---|---|
| Score | Nonbac | Bachelor | Masters |
| **Dualism** | | | |
| Position 2 | | | |
| 200-240 | | | 1 |
| Transition 2/3 | | | |
| 241-284 | 3 | 4 | |
| **Multiplicity** | | | |
| Position 3 | | | |
| 285-328 | 9 | 9 | 3 |
| Transition 3/4 | | | |
| 239-372 | 6 | 4 | 4 |
| Position 4 | | | |
| 373-416 | 2 | 2 | 8 |
| Transition 4/5 | | | |
| 417-460 | | 1 | 4 |
| **Relativism** | | | |
| Position 5 | | | |
| 461-500 | | | |
| N = 60 | 20 | 20 | 20 |

done with caution because levels of education may differ between studies and sample size may not be representative.

Education and Intellectual Development

In testing for differences in intellectual development among levels of education (nonbaccalaureate, baccalaureate, and masters), level of education was found significant. Table 6 shows the summary statistics of LEP scores for education and gender, and Table 7 shows the ANOVA table with alpha at .05. Education was significant with $F(2,54) = 9.14$, $p < .001$. Follow-up comparison tests using the Tukey test with alpha at .05 showed that those with a master's degree scored significantly higher in intellectual development than those with either a baccalaureate or less than a baccalaureate. No significant difference was found between groups with a baccalaureate and without a baccalaureate. Finding a significant difference in educational level was consistent with other studies testing education separately from age (Mentkowski et al., 1983; Reisetter Hart et al., 1995; Schmidt, 1983; Shoff, 1979; Strange, 1978). As the level of education increases, there is movement along the continuum of intellectual development.

Different themes on learning and teaching voiced in the focus groups helped explain the differences among levels of education.

Learning. The instructors representing Perry's Positions 2/3 and 3, described learning as a hierarchy. During the discussion, lower-level learning was perceived as understanding, application, and transfer. Higher-level

**Table 6**

Summary Statistics of LEP Scores for ANOVA Group Variables

| Groups | Mean | SD | Variance | n |
|---|---|---|---|---|
| Nonbaccalaureate | 321.85 | 36.36 | 1322.05 | 20 |
| Bachelor's Degree | 323.90 | 47.47 | 2253.40 | 20 |
| Master's Degree | 374.00 | 49.95 | 2495.00 | 20 |
| Male | 326.47 | 50.61 | 2561.37 | 30 |
| Female | 353.39 | 47.37 | 2243.92 | 30 |

**Table 7**

Two-Way ANOVA for Intellectual Development by Education and Gender

| Source | df | Sum of Squares | Mean Square | F Ratio | F Prob |
|---|---|---|---|---|---|
| Education | 2 | 34892.23 | 174446.12 | 9.14 | <.001* |
| Gender | 1 | 10854.15 | 10854.15 | 5.69 | <.05* |
| Educ/Gender | 2 | 1456.30 | 728.15 | .38 | >.05 |
| Within Groups | 54 | 103017.90 | 1907.74 | | |
| Total | 59 | 150220.58 | | | |

learning was perceived as decision making, problem solving, and critical thinking. There was uncertainty about (a) whether or not students had to be at certain levels before higher-level learning would be possible and (b) the generalizability of higher-level skills across disciplines.

The instructors representing Perry's Positions 4 and 4/5, described learning as a process. The focus was on how to think and the ways of thinking--inductive reasoning, problem solving, creativity, analyzing, and metacognition. Learners become active and independent. Students are to be challenged and expected to develop rationale for their decisions. Skills were seen as generalizable within similar contexts.

Teaching. The instructors representing Perry's Position 2/3 and 3 perceived teaching as structured, inflexible, or formal. Most described their teaching environment through absolutes, rules, concrete examples, and practicality. Adapting to changes in technology was seen as difficult.

The instructors representing Perry's Positions 4 and 4/5 perceived teaching as unstructured, flexible, or informal. The emphasis was on the responsibility of the learner through self-directed learning. Students and colleagues with diverse viewpoints were important sources for teaching. Interaction and interpersonal skills were necessary in the classroom. Change was viewed and an opportunity.

The instructors representing Perry's Positions 2/3 and 3 seemed to prefer a teacher-orientated learning environment while the instructors

representing Perry's Positions 4 and 4/5 seemed to prefer a student-orientated learning environment which is consistent with the theory of intellectual development.

Gender and Intellectual Development

In testing for differences between men and women, women in this study scored significantly higher in intellectual development than men. Table 7 shows that gender had a significant $F$ (1,54) = 5.69, $p < .05$.

Usually men have scored significantly higher in intellectual development than women in studies with nontraditional groups (King, Wood, & Mines, 1990; King et al., 1983; Lawson, 1980; Strange, 1978; Shoff, 1979). Only one other study has found females scoring higher than males (Schmidt, 1983). Nontraditional was defined as 23 years of age in Schmidt's study; consequently, generalizations were limited to the definition. In past research, however, the definition of nontraditional has varied in age. This is the first study to compare men and women between the ages of 35 and 65 years of age.

The significant finding for gender must be explained by validation of the instrument, distribution of the variables, or identification of an underlying variable(s). In the reliability and validity studies of the original LEP instrument, no significant difference was found between men and women based on a gender-balanced subsample of 470 subjects drawn randomly. In this study, normal distributions were shown for gender during the testing of the

assumptions for running the ANOVA procedure. Thus, focus groups were used to identify any plausible underlying variables to explain gender differences.

From the focus group findings, women were seen as more nurturing, people-orientated, and patient, in addition to having good networking and group decision-making skills. The individualized learning environment at the technical college was perceived to promote more informal relationships where women were viewed as seeking out the students more than men. In addition, the women in the institution were viewed as more liberal, motivated and powerful. Men were seen as choosing to isolate themselves from the students and being defeated in the power structure of the college's organization as the number of male administrators decreased.

These focus group findings on gender are parallel to findings from a study by Belenky, Clinchy, Goldberger, and Tarule (1986) with 135 women which was a replication of Perry's (1970) study with men. In both studies, women were perceived to seek out relationships and nurture others.

Education, Gender, Age, and Intellectual Development

In testing for relationships between intellectual development and education, gender, and age, two variables were found to be significant. Table 8 shows education with $p < .001$ to be more significant than gender with $p < 05$. This was not surprising after finding significant differences between and

**Table 8**

Multiple Regression Statistics for Intellectual Development and Education, Gender, and Age

| Variables | B | SE B | Beta | T | Sig T |
|---|---|---|---|---|---|
| Education | 26.1779 | 7.0394 | .4272 | 3.72 | .0005* |
| Gender | 28.0759 | 11.5914 | .2806 | 2.42 | .0187* |
| Age | .5879 | .7524 | .0905 | .78 | .4378 |

Multiple R = .51122 Standard Error = 44.5133
R Square = .26135 F-Ratio = 6.605
Adjusted R Square = 44.51330 P < .0007

among groups in research questions one and two. Age did not have a significant relationship with intellectual development. As an independent variable, age had the smallest coefficient of .59. This was an important finding, showing that education rather than age (maturation) was significantly related to intellectual development of technical college instructors in this study.

## Conclusion

The theory of intellectual development has been expanded on a limited basis. In this group of technical college instructors, education was more critical to intellectual development than age or maturation. Because the age

distribution had representation in all age groups between 35 and 65 years of age, the generalizability of education can be extrapolated into older age groups in this study.

More research needs to be done to investigate education and intellectual development in older populations in other environments to further expand the generalizability of the theory. If future research shows education more critical to intellectual development than age, the theory of intellectual development needs to move from a descriptive to a prescriptive theory to better facilitate intellectual development of adults.

In today's global market along with the acceleration of change, trends are towards a more diverse workplace, life-long learning, multiple career changes, and more adults in our educational systems. Some of the questions we need to address are: Should intellectual development be a mission for educating adults in our diverse world? Can educators at a level of Multiplicity challenge students who are in Relativism? What would be the potential for intellectual development of adults if instructional methodologies were designed for moving students towards Relativism and Commitment?

**References**

Beers, S. E. & Bloomingdale, J.R. Jr. (1983, April). Epistemological and instructional assumptions of college teachers. Paper presented at the meeting of the American Education Research Associating, Montreal, Canada.

Belenky, M. F., Clinchy, B. M., Goldberger, N. R. & Tarule, J. M. (1986). Women's ways of knowing: The development of self, voice, and mind. New York: Basic Books.

Glatfelter, M. (1982). Identity development, intellectual development, and their relationship in reentry women. Unpublished doctoral dissertation, University of Minnesota, 1982. MnU-D 82-290.

King, P. M., Kitchener, K. S., Davison, M. L., Parker, C. A. & Wood, P. K. (1983). The justification of beliefs in young adults: A longitudinal study. Human Development, 26, 106-116.

King, P. M., Wood, P. K., & Mines R. A. (1990). Critical thinking among college students. The Review of Higher Education, 13(2), 167-186.

Kitchener, K. S. & King P. M. (1981). Reflective judgement: Concepts of justification and their relationship to age and education. Journal of Applied Developmental Psychology, 2, 89-116.

Krueger, R. A. (1988). Focus groups: A practical guide for applied research. Newbury Park: Sage.

Lawson, J. M. (1980). The relationship between graduate education and development of reflective judgment: A function of age or educational

experience? (Doctoral dissertation, University of Minnesota, 1980). Dissertation Abstracts International, 41, 4655A. (University Microfilms No. 8109461).

Mentkowski, M. Moeser, M., & Strait, M. J. (1983). Using the Perry Scheme of Intellectual and Ethical Development as a College Outcomes Measure: A Process and Criteria for Judging Student Performance. Milwaukee: Alverno College, Office of Research and Evaluation.

Moore, W. S. (1990). The learning environment preferences: An instrument manual. Olympia: Center for the Study of Intellectual Development.

Moore, W. S. (1989). The learning environment preferences: Exploring the construct validity of an objective measure of the Perry Scheme of Intellectual Development. Journal of College Student Development, 30, 509-514.

Perry, W. G. Jr. (1968). Patterns of development in thought and values of students in a liberal arts college: A validation of a scheme. U. S. Department of Health, Education and Welfare; Office of Education, Bureau of Research, Final Report, Project No. 5-0825, Contract No. SAE-8973.

Perry, W. G. Jr. (1970) Forms of Intellectual and Ethical Development in the College Years: A Scheme. New York: Holt, Rinehart.

Perry, W. G. Jr. (1981). Cognitive and ethical growth: The making of meaning. In A. Chickering (Ed.), The Modern American College. San Francisco: Jossey-Bass.

Reisetter Hart, J., Richards, W. H., & Mentkowski, M. (1995). Epistemological development during and after college: Longitudinal growth on the Perry Scheme. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.

Schmidt, J. A. (1983). The intellectual development of traditionally and nontraditionally aged college students: A cross-sectional study with longitudinal followup. (Doctoral dissertation, University of Minnesota, 1983). Manu D83-408.

Shoff, S. P. (1979). The significance of age, sex, and type of reasoning in adults (Doctoral dissertation, The University of Utah, 1979). Dissertation Abstracts International, 40, 3910A. (University Microfilms No. 8000970).

Simpson, D. E., Dalgaard, K. A., & O'Brien, D. K. (1986). Student and faculty assumptions about the nature of uncertainty in medicine and medical education. The Journal of Family Practice, 23(5), 468-472.

Strange, C. C. (1978). Intellectual development, motive or education and learning styles during the college years: A comparison of adult and traditional age college students (Doctoral dissertation, University of Iowa, 1978). Dissertation Abstracts International, 39, 4768A. (University

Microfilms No. 7902948).

Terenzini, P. T. & Pascarella, E. T. (1990). Twenty years of research on college students: Lessons for future research. Proceedings of the Association for Institutional Research 1990 Annual Meeting, Louisville, KY, May 13-16.

Welfel, E. R. (1982). How students make judgments: Do educational level and academic major make a difference? Journal of College Student Personnel, 23(6), 490-497.

Welfel, E. R. & Davison, M. L. (1986). The development of reflective judgment during the college years: A 4-year longitudinal study. Journal of College Student Personnel, 27(3), 209-216.